

Appln. No.: 10/507,286
Amendment Dated January 5, 2006
Reply to Office Action of September 9, 2005

NSG-238US

Amendments to the Claims: This listing of claims will replace all prior versions, and listings, of claims in the application

Listing of Claims:

1. (Currently Amended) A method for controlling an operation of a wiper by directing light emitted from a light emitting element to a detection area provided at a part of a wiper wiping region of a vehicular windshield glass, receiving light reflected on the detection area by a photo detector, and detecting a state of the detection area, comprising the steps of:

(a) collecting water by a wiping operation;

(b) detecting the amount of the collected water passing through the detection area, with the water being carried by wiping operation of the wiper and;

~~(b)~~(c) detecting an impact of a raindrop on the detection area;

~~(c)~~(d) judging whether or not the amount of water passing through the detection area is not smaller than a predetermined threshold value;

~~(d)~~(e) judging whether or not the impact of the raindrop on the detection area is detected if the amount of water passing through the detection area is not smaller than the predetermined threshold value; and

~~(e)~~(f) carrying out control to decrease frequency of wiping operation of the wiper if the impact of the raindrop on the detection area is not detected.

2. (Original) The wiper control method according to claim 1, wherein when a judgment result that the amount of water passing through the detection area is not smaller than the predetermined threshold value and the impact of the raindrop on the detection area is not detected continues a plurality of times, control is carried out to decrease the frequency of wiping operation of the wiper.

3. (Original) The wiper control method according to claim 1 or 2, wherein when the wiper operates at a high wiping speed, the control to decrease the frequency of wiping operation of the wiper is control to switch over the wiping speed to a lower speed.

4. (Original) The wiper control method according to claim 1 or 2, wherein when the wiper operates in a continuous mode, the control to decrease the frequency of wiping operation of the wiper is control to switch over the mode to an intermittent mode.

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5. (Original) The wiper control method according to claim 1 or 2, wherein when the wiper operates in an intermittent mode, the control to decrease the frequency of wiping operation of the wiper is control to switch over the period of wiping operation to a longer period.

6. (Original) The wiper control method according to claim 1 or 2, wherein when the wiper operates in an intermittent mode, the control to decrease the frequency of wiping operation of the wiper is control to switch over the state to a waiting state.

7. (Currently Amended) ~~The wiper control method according to claim 1 or 2, A~~
method for controlling an operation of a wiper by directing light emitted from a light emitting element to a detection area provided at a part of a wiper wiping region of a vehicular windshield glass, receiving light reflected on the detection area by a photo detector, and detecting a state of the detection area, comprising the steps of:

- (a) detecting an amount of the collected water passing through the detection area,;
- (b) detecting an impact of a raindrop on the detection area. With the water being carried by wiping operation of the wiper;
- (c) judging whether or not the amount of water passing through the detection area is not smaller than a predetermined threshold value;
- (d) judging whether or not the impact of the raindrop on the detection area is detected if the amount of water passing through the detection area is not smaller than the predetermined threshold value; and
- (e) carrying out control to decrease frequency of wiping operation of the wiper if the impact of the raindrop on the detection area is not detected;

wherein when the wiper operates in an intermittent mode, the predetermined threshold value is changed according to the ~~a~~ period of wiping operation of the wiper.

8. (Currently Amended) A device for controlling an operation of a wiper by directing light emitted from a light emitting element to a detection area provided at a part of a wiper wiping region of a vehicular windshield glass, receiving light reflected on the detection area by a photo detector, and detecting a state of the detection area, comprising:

a wiping frequency switching-over means, the wiping frequency switching-over means comprising:

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means for receiving as inputs a detection result of the amount of water passing through the detection area, with the water being carried to the detection area by wiping operation of the wiper, and a detection result of an impact of a raindrop on the detection area;

means for judging whether or not the amount of water passing through the detection area is not smaller than a predetermined threshold value;

means for judging whether or not the impact of the raindrop on the detection area is detected if the amount of water passing through the detection area is not smaller than the predetermined threshold value; and

means for carrying out control to decrease frequency of wiping operation of the wiper if the impact of the raindrop on the detection area is not detected.

9. (Original) The wiper control device according to claim 8, wherein, the wiping frequency switching-over means further comprising means for carrying out control to decrease the frequency of wiping operation of the wiper, when a judgment result that the amount of water passing through the detection area is not smaller than the predetermined threshold value and the impact of the raindrop on the detection area is not detected continues a plurality of times.

10. (New) The wiper control method according to claim 1 or 2, wherein:

step (a) includes the step of collecting water from first and second portions of the windshield glass, the first and second portions being different in area; and

step (d) includes the steps of determining a difference between the collected water from the first portion and the collected water from the second portion and judging whether the difference is not smaller than the predetermined threshold value.